27. [12] The method for designing and constructing a lighting application oriented luminaire of claim 26, providing light intensity, spectrum, and spatial distribution of intensity and spectrum, suited to the environment to be illuminated in terms of illumination, spectrum and glare consistent with lighting practice and the mounting position of the luminare further comprising steps selected from the group consisting of:

a. determining the lighting application, and the recommended lighting practices for the lighting application, and
b. determining the luminaire mounting position, illumination area covered and usage typical of the lighting application, and
c. determining light power required to effect the required controlled illumination over the area, and
d. selecting light source types capable of producing required intensities and spectrum at highest conversion efficiencies at lowest economic cost, and
e. determining light source beam spreads, and
f. determining light source aimings for the required spatial distribution, and
g. determining electronics to control and power light source, and
h. determining lighting fixture surface geometry and size, and
i. testing whether the glare rating for the viewing angle is acceptable and
j. calculating if the glare rating is not acceptable and if found not acceptable,
k. changing light source beam spread, and/or fixture geometries, resulting in an acceptable glare rating; and,
l. designing the luminaire aesthetics per the requirements of the lighting application.

Remarks:

In reply to point 1: *Election/Restrictions*

1. Applicant's election with traverse of Invention I including Species I in the reply filed on 13 January 2005 is acknowledged. The traversal is on the ground(s) that Species II and III is a physical device based on the multiple light source illumination system of Species I. This is not found persuasive because Species II and III is luminaire

device having different structures and light modifiers, so that they are patentably distinct. In view of these, Species I, including claims 1-6 and 11-12 are examined.

The applicant has superficially amended the specification to make the purpose of Fig 2B,C and 3B indicate more clearly that they are illustrative structural embodiments of the principles of this invention. The applicant respectfully wishes to explain why these "distinct structures" are part of the same invention.

The nature of this invention is subtle insofar as it is using the same elements as the prior art devices and yet can be applied to a number of structures. The difference from prior art is, that in this invention, the quantity and wavelength of photons emanating (from the individual light sources mounted on the illuminating device) in a certain direction is based on orientation of the illuminating device to the environment and is in concert with the illumination requirements in that environment.

For example a light source having a symmetric light distribution in a square room would give more illumination in the center of the room than in the more distant corners due to the inverse square law. In the present invention, the placement of the individual light sources (emanating photons in a known direction) on the illuminating device is such, that when the illuminating device is oriented relative to the room as designed, the illumination in the far corners of the room will be equal to the illumination in the center of the room. While the block diagram of species 1 is illustrating the interrelationships of the workings of the various possible elements comprising the illuminating device, the rest of the species in the specification are variations on this basic theme of "photonic addressing". That is, knowing in the construction stage where the photon is going to be impinging in the environment it is to be illuminating.

This relationship between the species is explained in the specification in relation to species 2 in paragraph [108] "Fig 2B illustrates the teachings of the present invention. In this case, although packaged to appear as a typical "A" shaped light bulb, the device is actually a DLF and provides a complete lighting solution.". The amendment to the Figure titles is intended to clarify this connection.
The applicant respectfully requests the reconsideration of the restrictions on the other species integrally related to species 1 and allowing their claims.

(If after further trying to explain his invention (above and continued below) in this reply, the applicant has not succeeded in proving the point, the applicant believes a phone conversation is in order and asks if the examiner can let him know when this is possible per the applicants email below.)

In reply to point 2: *(The abstract of the disclosure is objected to because the total number of words is exceeding 150. Correction is required. See MPEP § 608.01 (b).*

The applicant reduced the size of the abstract and placed the original wording as part of paragraph [0196].

In reply to point 3: *Claim Objections*

The applicant has made changes to correct for the informalities in the claims 1-4, 6, and 12. (now claim 20 - 23 and 25 and 27)

In reply to point 4 and 5 : *Claim 4 is rejected as failing to define the invention in the manner required by 35 US.C 112, second paragraph .The claim(s) are narrative in form and replete with indefinite and functional or... .*

The applicant has rewritten claim 4 (now claim 23) to comply with 35 US.C 112.

In reply to point 6:

The applicant has rewritten Claims 11 and 12 (now claim 26 and 27) to comply with 35 US.C 112 by adding antecedents.

In reply to point 7 and 8: *Claims 1-5 and 11-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Amerson et al. [US 6,379,022]and Lys [6,340,868].*

Regarding claim 1, Amerson etal. discloses an illuminating device having a plurality of light sources [402, 404] attached to a structure with a predetermined form [rectangular], which have a spatial light intensity distribution characteristic and a mixing,... .

Regarding claim 1, the applicant submits that Amerson, like those before him in the prior art, make application specific solutions using multiple LEDs as one would use a flashlight lamp or in this case, a similar camera flash. Amerson's disclosure (col. 2 and 3) in no way anticipates a generalized illumination device suitable for use for human vision. According to his methodology, his rectangular shape, Fig. 4 will always be a rectangular shape irrespective of the lighting environment or lighting application.

Amerson is using the multiple light source function to advantage to obtain adjustable color temperature based on camera detector factors. His colorimetry calculations will always produce white light and white light only for his camera's use.

Thus he is not correlating to a myriad of human factors stored in a logical controller such as color as a function of intensity as is the present invention (see paragraph 0147 and Fig. 10). His purpose was to maximize the lighting of an object for photography and did not disclose how to illuminate an environment optimally for human vision.

In a departure from the lamp replacement method of thinking about LED's for illumination, this invention skips the lamp stage and jumps to the end user application based lighting fixture i.e. luminare solution. (As an explanation of nomenclature; a lamp has little light distribution control and thus is not application specific but instead goes into a luminare which has reflectors and shades which control the light and prevent glare in a way tailored to the application. For example a night-table reading luminare will have to reign in the glaring lamp's output to perform the lighting application and thus a luminaire is an application specific device.) The problem with a luminare approach is that each application is specific and solutions such as Amerson's camera flash solve each application on a one per basis. Another such specific solution is a stage spotlight for providing multicolored illumination using multiple LED's such as in Lys.

As opposed to the single application solution of Amerson and Lys, the present invention discloses a novel, flexible, generalized method for constructing various application oriented luminaires. Thus regarding claim 1, Amerson's illuminating device is always a flat array structure with a predetermined rectangular form since it is always intended to be illuminating an object, while the present invention has a structure correlated to the environment which is to be illuminated and a synergistic light intensity, spatial intensity distribution and spectrum mixing, adding and distributing according to the varied correct lighting practice of the lighting applications. Amerson does not disclose how to lay up the geometry of the structure for the lighting application at-hand and thus can not have anticipated the preset invention.

The applicant respectfully requests the withdrawal of the rejection of claim 1.

Regarding claim 2,

The applicant submits that Amerson's use of a plurality of individual light sources is limited to the correction of color temperature for an improved camera flash function. The present invention (see paragraphs 0113 and 0114) uses the plurality of light sources to affect a multitude of synergistically interrelated effects of spatial light distribution, color rendering and color temperature for use in more applications than just a camera.

Amerson's teaching of a plurality of individual light sources does not anticipate the novel

combined use of geometry as well as spectrum to effect various application specific illumination tasks.

The applicant respectfully requests the withdrawal of the rejection of claim 2.

Regarding claim 3, Amerson et al. discloses a means for changing light emanating characteristic of light sources (figures 1-3, column 3 lines 19-25 and column 5 lines 40-45).

The applicant submits that Amerson is carrying out colorimetry matching for a camera and does not anticipate the real-time, combined spatially and spectrally adjustable illumination disclosed in the present invention. Paragraph 0062 of the specification states "This flexibility is useful as for example in a multi-source luminaire with spatially differentiated dimming capability used in an office lighting application. In a normal day's operation, such as in a windowed room between peak daylight and night-time hours, the intensity and color temperature of the light varies greatly over different portions of the room. The smooth variation possible with many light sources ("digits") vs. one light source offers superior flexibility in providing the actual lighting needs." Often day lighting will penetrate unevenly in a room. The luminare of the present invention with its novel design, is capable of dimming on the window side, in a different intensity and color temperature, than on the far side. The prior-art referred to, lacks the hardware and processor means to carry out any kind of sophisticated illumination function such as asymmetric dimming.

The applicant kindly requests the withdrawal of the rejection of claim 3 as the prior art did not anticipate the preset invention.

Regarding claim 4,

Thus regarding claim 4, Amerson's teaching of a plurality of individual light sources does not anticipate the novel combined use of geometry as well as spectrum to effect various application specific illumination tasks. Amerson's structure is always a rectangular array structure with a predetermined form since it is always intended to be illuminating an object. Paragraph 0110 and Fig.2B show how a structure of the present invention is correlated to the environment which is to be illuminated. A synergistic light intensity, spatial intensity distribution and spectrum mixing, adding and distributing according to

the varied correct lighting practice of the lighting applications is described. Amerson does not disclose how to adapt the structure for the lighting application at hand and thus can not have anticipated the preset invention.

The applicant respectfully requests the withdrawal of the rejection of claim 4.

Regarding claim 5, Amerson et al. discloses a power supply [battery] (column 5 lines 51-52).

The power supply of claim 5 is not anticipated by Amerson as it is part of the system of an illuminating device providing controlled illumination in an environment to be illuminated comprising a plurality of independent light sources in a structure having predetermined form and orientation where said orientation is capable of being correlated to said environment to be illuminated actively taking part in carrying out the effects the mixing, adding and distribution of emanating light such that illumination in the environment to be illuminated is a product of said plurality of independent light sources.

The applicant respectfully requests the withdrawal of the rejection of claim 5.

Claim 11, Amerson et al. discloses a method for designing an application oriented luminaire having determining application and illuminance requirement....

The applicant submits that Amerson's methodology does not anticipate the present invention as it does not take into account the geometrical features, length width, height of the environment which is to be illuminated. The specification in paragraph 0173 and Fig. 14 describes in detail the unique design process including " determining the luminaire mounting height, illumination area covered... , determining lighting fixture surface geometry and size, testing whether the glare rating for the viewing angle is acceptable, if the glare rating is not acceptable, then changing SLS beam spread, fixture geometries, or size, resulting in an acceptable glare rating; and, ... when the glare rating is acceptable, then designing the luminaire aesthetics for the application." Amerson's camera flash certainly produces glare and is not a general illuminating device constructed based on the principles of correct lighting practice (see specification para. 0045) such that its teachings do not anticipate the present application.

The applicant respectfully requests the withdrawal of the rejection of claim 11.

Claim 12, Amerson et al. discloses steps of determining lighting application and recommended lighting practice for the application [capture an image with a digital camera], determining luminaire mounting height [figure 4], determining light power...

The applicant submits that Amerson like his prior art predecessors has developed another application specific auxiliary illuminating device design, (abstract and col. 2 line 27 – 32) as opposed to the general illuminating device of the present application. His system is limited to the function of an adjustable color temperature. Replacing a single lamp with multiple light sources is used only to effect the illuminations spectrum. For example his "determining luminare mounting height, [Fig. 4]," refers to the height of the rectangular LED array above the camera. In the present invention the luminaire mounting height is referring to the intended placement of the luminare in relation to the environment to be illuminated which always changes according to the specific environment.

Amerson's geometry is always rectangular thus he has no methodology to determine said geometry as it is fixed. Note that determining the "glare rating [light intensity control] is not the method of the present application. Paragraph 0083 states: "To get the desired luminous exitance .... the light exiting the source of specific intensity at angles which normally reach the room occupant's eyes, is spread over an area such that the exiting light is non-glaring. These lighting design parameters serve as the product specification and are incorporated into the initial design." Thus instead of altering the intensity, the novel calculation is based on the luminous exitance per unit area. Where according to the teachings of the present invention the size of the luminare would be varied to increase the surface area of light exitance a'-priori before the design left drawing board. Amerson does not teach such design considerations in laying up his multiple light source camera flash and person of ordinary skill could not learn from the very specific and highly limited methodology of the camera flash device to the flexible, general illumination application specific design methodology of the present multiple light source invention.

The applicant respectfully requests the withdrawal of the rejection of claim 12.

In reply to point 9 and 10: *35 U,S,C, 103(a) Obviousness*

Claim 6 is rejected under 35 U,S,C, 103(a) as being unpatentable over Amerson in view of Lys [US 6,340,868]

Regarding Claim 6 .... Controller... Lys at al. discloses the controller being selected from the closed loop controller by use of a programming method for a current control of a LED lighting assembly ... column 9 lines 45-55, column 16 lines 56-63), It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the control system of Amerson et al by the current controller....

The applicant respectfully submits that Lys is not using his controller in a multiple light source illumination device providing controlled illumination in the environment to be illuminated where the light sources are held by a structure having predetermined form and orientation where said orientation is capable of being correlated to said environment to be illuminated actively taking part in carrying out the effects the mixing, adding and distribution of emanating light such that illumination in the environment to be illuminated is a product of said plurality of independent light sources. There is nothing to suggest in the prior art that the key to making the multiple light source luminare function exceptionally well in general purpose illuminating device lies a pulse width modulated ("PWM") current control or other form of current control where each current-controlled unit is uniquely addressable. It is only after the flexible capabilities resulting from the possible combination of the two systems for generalized lighting application are realized that the controller's use seems obvious. There must be some reason for the combination other than the hindsight gleaned from the invention itself. As such a controller is more difficult and costly to implement, it would not have been selected by a person having ordinary skills in the art. The illuminating device would have been easily designed using simpler control systems and there is nothing in the prior art making the combination obvious.

The applicant respectfully requests the withdrawal of the rejection of claim 6.

Conclusion

The applicant submits that the claims are now in proper form and that the claims all define patentability over the prior-art. The claims have been amended so that they are

proper, definite and define novel structure and method which is also not obvious. Therefore the applicant submits that this application is now in condition for allowance, which action he respectfully solicits.

Conditional Request for Constructive Assistance

Should the examiner still prefer to have these or any or any other claims amended to remove informalities and more clearly highlight the uniqueness of the present invention, the pro se applicant requests under M.P.E.P. § 2173.02 and §707.07(j) that the examiner should draft one or more claims for the applicant and indicate in his or her action that such claims would be allowed if incorporated in the application by amendment. This request is in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,

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